Attachment 1.

Process Requirements for the Maintenance of Software Developed by or for LaRC

Upon receiving a TA involving the maintenance of software developed by or for LaRC, the Contractor shall:

1) Collect and catalog all relevant source code, object code, test cases, and documentation. Establish this materiel as a baseline for possible future modifications.
2) Meet with the Software Manager to obtain an understanding of the function, use, and structure of the software.
3) Establish procedures for receiving, recording, and tracking problem reports and modification requests (depending on level of maintenance required) from the users and providing feedback to the users.
4) Establish procedures for notifying the LaRC Software Manager of problem reports and modification requests and for prioritizing the work associated with responding to them.
5) Establish a Configuration Management System (See *IEEE/EIA Standard 12207.0-1996, Clause 6.2, Configuration Management Process*) for managing modifications to the software.
6) Establish procedures for problem and modification analysis to include the following tasks (See *IEEE/EIA Standard 12207.0-1996, Clause 5.5.2*):

- Analyze the problem report or request for modification for its impact on the existing system and the interfacing systems.
- Replicate or verify the problem.
- Consider options for implementing the correction or modification and document the selected option.
- Obtain approval for the selected modification

7) Establish procedures for implementing modifications to include the following tasks (See *IEEE/EIA Standard 12207.0-1996, Clause 5.5.3*)

- Determine and document which software units and versions thereof need to be modified.
- Use the Process for System and Application Development given in this TA to implement the modification, in accordance with the software control class. In addition define and document test and evaluation criteria for both modified and unmodified parts of the system and ensure that the modification was implemented correctly and that original and unmodified functions were not affected.
- Document test results.

8) Establish procedures for maintenance review and acceptance to include (See *IEEE/EIA Standard 12207.0-1996, Clause 5.5.4*) review of the functionality and integrity of the corrected or modified system and its acceptance by LaRC.
9) Establish procedures for migration if the software product is migrated from an old to new operational environment (See *IEEE/EIA Standard 12207.0-1996, Clause 5.5.5*).
10) Establish procedures for retirement of software if software is to be retired on the request of the owner (See *IEEE/EIA Standard 12207.0-1996, Clause 5.5.6*)
11) Document the above procedures in a Maintenance Plan.

The Maintenance Plan shall be delivered as part of the Task Plan or the date of its delivery shall be specified in the Task Plan. The Maintenance Plan shall itself be maintained under a Configuration Management System and shall be followed for the lifetime of the Task Assignment.

Attachment 2.

Process Requirements for Systems and Applications Development

Upon receiving a TA involving system and application development, the Contractor shall meet with the LaRC Software Manager and other involved personnel to obtain a more complete understanding of the requirements. If the TA is for the first stage of a two stage development, a Task Plan shall be delivered by the date specified in the TA that will outline the steps to be taken to develop the SPMP and will give a date for its delivery. If the TA is for the entire effort, a Task Plan that will include the SPMP shall be delivered by the date specified.

The following requirements apply to system or application development involving software classified as low control:

1) The SPMP shall contain the following elements:
- Project Title
- Background and objective
- Contractor Software Manager
- Definition of the life-cycle requirements, including the overall scope and purpose of the project, requirements for systems analysis and planning, system integration, software design and development, software modification, testing, qualification, installation, operation, and maintenance.
- Constraints such as milestones, required programming languages, required development approach, interface requirements, standards, mandates, or resource restrictions.
- Defined responsibilities of LaRC and Contractor personnel.
- The software development approach that will be used; i.e., waterfall, spiral, prototyping.
- Plans for verification and validation
- Deliverables and delivery schedule – including documentation.
- Acceptance Criteria.
- Software Configuration Management Plan (See IEEE Standard 828-1998)
- Installation Plan (If requested as part of the project) – Including the mechanisms that will be used for replication delivery, installation of the software, and training the requester to use the products delivered.
- Operational Support Plan (If requested as part of the project) – Including the activities and tasks for which the operator is responsible and the point of contact for requestor support.
- Maintenance Plan (If requested as part of the project) – Including level of maintenance to be performed; how problems and/or modifications are identified, classified, prioritized, tracked, and analyzed; and the approval, implementation, and test procedures to be used.
- Risk Management - If risks to project completion are identified.
- Government furnished equipment, data, and information. Installation accountable equipment.
- Joint review attendance, record keeping procedures, and distribution procedures.

2) The SPMP shall itself be controlled under a configuration management system. The baseline SPMP shall be as approved by the LaRC Software Manager at the initiation of the project. Start and end dates of the SPMP schedule elements shall be updated and reported to the LaRC Software Manager as the schedule changes.

3) Software development activities shall be performed after the approval of the baseline SPMP.

4) Software activities shall be performed according to the current version of the SPMP.

5) A Software Version Description (SVD) shall be submitted to the LaRC Software Manager with each delivery. The SVD shall contain: project title, date of delivery, contractor point of contact, inventory of all baselined configuration items being delivered, including unique configuration item identifiers and descriptions, instructions for reading and installing configuration items, and a description of all changes incorporated in the delivery.

6) The contractor shall deliver information required to complete the Software Metrics Collection Sheet, located at URL: http://sw-eng.larc.nasa.gov/process/forms.html. For major software activities this information must be delivered on a quarterly basis.

For system or application development involving software classified as high control the SPMP shall be developed following IEEE Standard 1058-1998 (IEEE Standard for Software Project Management Plans). In addition to above requirements for low control, the following processes are required:

7) The minimum contents of documentation must be as described in IEEE Standard 12207.1-1997.
8) Risk to the project shall be identified, documented, analyzed, planned, tracked, and controlled on a continuous basis.
9) The mechanism that specifies how problems will be documented, tracked, and resolved must be defined.
10) The procedures to be used for performing the following tracking and oversight activities must be specified

- Authorizing new commitments
- Communicating changes to commitments to software staff
- Tracking and recording actual software size, effort, cost, and schedule of work products against estimates; recording deviations; and recording the revised schedule. Note: When it is vital to the success of the project, computer resource utilization must also be tracked.
- Tracking progress of technical activities and work products, and taking corrective action.
- Conducting periodic reviews to track and record technical progress, plans, performance, and issues against the SPMP.

11) The SPMP must specify the software project tracking and oversight records to be retained.

If the software is classified as critical control, additional or more detailed requirements will be specified in the TA.

Attachment 3.

Process Requirements for Operations

Upon receiving a TA involving operations, the Contractor shall:

1) Collect and catalog all documentation relevant to the operation of the work area. Establish this materiel as a baseline for possible future modifications.
2) Meet with the LaRC Manager and users/customers to obtain an understanding of the organization, function, and use of the work area.
3) Establish procedures for operating the work area and performing the activities described in the Task Assignment.
4) Establish procedures for receiving, recording, and tracking requests for services from users/customers, and providing feedback to the users/customers.
5) Establish procedures for notifying the LaRC Manager of requests for services and for prioritizing the work associated with responding to them.
6) Establish procedures for diagnosing and reporting problems and following up on their resolution.
7) Document the above procedures in an Operations Plan.

The Operations Plan shall be delivered as part of the Task Plan or the date of its delivery shall be specified in the Task Plan. The Operations Plan shall be maintained under a Configuration Management System and shall be followed for the lifetime of the Task Assignment.